DEQ/EPA/LWG Technical Stormwater Team Sampling Methods Concepts

DQO	Level of Certaintyc	Method	Specific Needs for This DQO	Notes
1. RI/FS - Understand contribution of stormwater to fish tissue chemical burdens (RI/FS techniques for these objectives also include in-river "farfield" surface water sampling during storm events and seasonal sediment trap).	Medium[a]	Flow-weighted composite water samples	Min. 3 events per site, auto samplers or tended pump, large volume for low DLs*, filtered/unfiltered pairs, modified standard analytical methods	The need for whole water vs. filtered water would be dependent on the final version of in-river Fate and Transport model. The model currently calls for whole water but may be modified as modeling discussions continue. Also, because each event is a composite over a range of conditions, it is assumed that relatively few events need to be sampled at each site. Also, it is assumed that flow-weighted (not time-weighted) is preferred since it more directly supports loading calculations.
		High volume water resin/filtration (time-weighted composite)	Min. 3 events per site, auto samplers or tended pump with filters and resin adsorption, modified analytical methods for resins	Similar to LWG surface water sampling methods. Achieves very low DLs. Requires large volumes of pumped water--may be difficult for small sites or small storm events. Allows determination of dissolved vs. particulate chemical concentrations.
		In-line sediment traps (and water TSS)	Deploy over seasonal period, sample 1-3 times in period per site, establish protocol for consistent placement and sampling for various junctions/pipe conditions, sample TSS in water multiple times** in period, analyze TOC in sediments, standard analytical techniques	Only measures particulate load.. Provides integration of variability over long periods. May be issues of selective sampling of certain particle sizes. Note that this technique is better suited to DQO2, which deals with particulate loads. For DQO1, this method provides an indirect means to calculate total water concentrations without accounting for dissolved loads, which may be a reasonable assumption for hydrophobic organics only (**Note 1**).
		Active filtration techniques (time-weighted composite)	Min. 3 events per site, auto samplers or tended pump with filters, standard analytical methods for sediments	Note 1 applies. This method actively collects particulates through filters or cyclonic collectors and results in solids analysis. Removes all particulates, so avoids selective sampling issues with sediment traps. Filter during events, so does not provide seasonal integration of sediment traps.
		Discrete water samples	Unlikely to be a viable technique for individual sites for loading purposes.	
2. RI/FS - Understand the contribution of stormwater chemicals to sediment recontamination potential(RI/FS techniques for these objectives also include in-river "farfield" surface water sampling during storm events and seasonal sediment trap).	Medium[a]	Flow-weighted composite water samples	Same methods as above	Filtered vs. unfiltered water would be needed to identify particulate fraction that contributes to recontamination. Also, because each event is a composite over a range of conditions, it is assumed that relatively few events need to be sampled at each site. Also, it is assumed that flow-weighted (not time-weighted) is preferred since it more directly supports loading calculations.
		High volume water resin/filtration	Same methods as above	Same notes as above.
		In-line sediment traps (and water	Same methods as above. Analyze grain size to understand preferential settling in river.	Only measuring particulate load acceptable for sediment recontamination DQO.
		Active filtration techniques	Same methods as above. Analyze grain size to understand preferential settling in river.	Only measuring particulate load acceptable for sediment recontamination DQO.
		Discrete water samples	Same as above	
3. DEQ Source Control Program: (as provided by DEQ during the Management Meeting on Nov. 4, 2006) Determine that stormwater from a particular source will not recontaminate sediment, will not result in a risk (toxicity) in the aquatic environment, and will not result in an unacceptable load to fish tissue (bioaccumulation). The DEQ Source Control Objectives are broken-out below into sub-categories based on the components of the JSCS process.				
3a. DEQ Source Control - Conduct screening to determine whether any particular stormwater source poses risks to the river now or after cleanup.	Ongoing and potentially significant source of COIs	High[b]	Same techniques as above	Same techniques as above, with greater number of events or deployments to increase certainty. Focus on particulate techniques for bioaccumulative loading and sediment recontamination issues. Focus on water sampling for direct toxicity and dissolved loading issues.	Same techniques as above

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DQO		Level of Certaintyc	Method	Specific Needs for This DQO	Notes
	High priority JSCS site where SCMs have been implemented and SCD has been issued	Medium[b]	Same techniques as above, but used in confirmation of SCs	Same techniques as above. Focus on particulate techniques for bioaccumulative loading and sediment recontamination issues. Focus on water sampling for direct toxicity and dissolved loading issues.	Same techniques as above
3a. DEQ Source Control (cont.).	High priority JSCS site that did not have exceedences of COIs for the AOPC in which it is located	Medium[b]	Same techniques as above	Same techniques as above. Because sediment contamination does not appear to be an issue, focus particulate sampling for bioaccumulation/loading issues and water sampling for direct water toxicity issues.	Same techniques as above
	Low priority site under JSCS	Low[b]	Discreet water samples	3 events, hand grabs, large volume for JSCS DLs, whole water (no filtration), modified standard analytical methods for JSCS DLs	Whole water is adequate for screening. If site fails screening it moves into the high priority categories and subsequent sampling would follow techniques consistent with that prioritization.
			Catch basin sediments	1 event, hand grab, standard analytical methods for JSCS DLs	Catch basin sediments adequate for screening. If site fails screening it moves into the high priority categories and subsequent sampling would follow techniques consistent with that prioritization.
			Other	Other techniques above could be used but may be more robust than necessary for an initial screening.	Same techniques as above
3b. DEQ Source Control - For sites where source issues identified, trace the ultimate source of risks identified for Objective 3a as necessary to identify necessary controls. (**Only applies to sites that become high priority.**)	High priority - source issues identified via Objective 3a.	High[b]	Sediment traps, active filtration	Use these techniques for tracing sources that are an issue because of bioaccumulative loading of hydrophobic compounds and sediment recontamination issues.	Same techniques as above
	High priority - source issues identified via Objective 3a.	High[b]	Discreet water samples, composite water samples	Use these techniques for tracing sources that are an issue because of direct water toxicity or dissolved chemical loading issues.	Same techniques as above
	High priority - source issues identified via Objective 3a.	High[b]	Catch basin sediments	Use these techniques for tracing sources that are an issue because of bioaccumulative loading of hydrophobic compounds and sediment recontamination issues.	Same techniques as above

Note: All sampling methods need to define the acceptable minimum storm conditions and range of storm conditions over which sampling should be conducted (e.g., first flush, high storm flow, low storm flow, seasonal range, min. 0.1 inch rainfall, storm duration requirements, etc.)

a - The Food Web Model has a currently accurate within 1 order of magnitude and the Fate and Transport model is likely at best only accurate to within two orders of magnitude, indicating that a medium certainty is adequate for these data uses.

b - Per DEQs Methodology Workgroup Notes.

c - Certainty refers to the level of certainty that is need for a decision on stormwater to be made relative to the DQO in question.

DL - Detection Limits

JSCS - Joint Source Control Strategy

COI - Chemical of Interest

SCM - Source control measures

SCD - Source control decision

* The exact DLs needed and volumes to meet those DLs not yet determined. A detailed lab protocol would need to be developed.

**The exact numbers of TSS samples has not been determined. Current proposals range from a few (T-4) to many (LWG), or a few with modeling of other conditions (LWG second alternative).